Example #5: The same system above is now whirled at a slower rate.

a) **What minimum speed must it have at the top of the circle so as not to fall from the circular path?**
b) **At the speed in (a) and neglecting any friction, how fast will the object be going at the bottom of the circle?**
c) **What is the tension in the cord at the bottom at this speed?**

$$F_c = F_g$$

$$\frac{\cancel{m}v^2}{r} = \cancel{m}g$$

$$v = \sqrt{rg} = \sqrt{2.5(9.8)}$$

$$\boxed{v = 4.9 \text{ m/s}} \quad (4.95)$$

b) Use conservation of energy to solve.

→ At top of circle, $E_T = E_p + E_k$

$$E_T = (.90)(9.8)\overset{(2\times r)}{(5.0)} + \frac{1}{2}(.90)(4.95)^2$$

$$= 55.1 \text{ J.}$$

→ At bottom of circle, $E_T = E_k$

$$55.1 = \frac{1}{2}(.9)v^2$$

$$\boxed{v = 11 \text{ m/s}}$$